NPAFC
Doc. 848
Rev. _____

Proposed Cruise Plans of TINRO-Center for BASIS Program Research on Pacific Salmon Marine Life Period in the Bering Sea in Summer Period of 2005

by

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Submitted to the

NORTH PACIFIC ANADROMOUS FISH COMMISSION

April 2005

THIS PAPER MAY BE CITED IN THE FOLLOWING MANNER:
O.S. Temnykh, I.I. Glebov, V.V. Sviridov. 2005. Proposed Cruise Plans of Russia for BASIS Research of Pacific Salmon Marine Life Period in the Bering Sea in June-October 2005. (NPAFC Doc. 848) 5p. Laboratory of Applied Biocenology, Pacific Scientific Research Fisheries Centre (TINRO-Center), 4, Shevchenko Alley, Vladivostok, 690950, Russia.

BRIEF DESCRIPTION OF SURVEY

The results of the Russian survey at the summer-autumn period of 2002-2004, as a part of the international BASIS program in the western Bering Sea, have showed significant changes in the structure and composition of the upper pelagic ecosystems of this region as compared with 1980-90-ies period. These changes resulted in the significant decrease of overall biological production due to the lowered abundance of walleye pollock and some other species. As the result of these changes, the mesopelagic fish species (Myctophidae), which were previously consumed by walleye pollock, became dominant in the pelagic layer of the deep-water regions of the western Bering Sea, as well as Pacific salmon, juvenile Atka mackerel and some squid species. The abundance of Pacific salmon (chum, sockeye and chinook) that are foraging in the Bering Sea has grown considerably since 1980-90-ies period.

The latter two years of research in the Bering Sea were relatively warm as compared with long-term averages. Despite of intensive autumn sea surface cooling and relatively early ocean-ward migrations of Pacific salmon, the abundance of chum, sockeye and chinook salmon in autumn 2004 remained relatively high as compared with 1980-1990-ies period. During the forthcoming 2005 survey, the thermal conditions are expected to be cooler, and a resultant changes in nekton and plankton communities' structure and functioning are expected. The continuation of Pacific salmon research in the Bering Sea is expected to enable to trace the dynamics of Pacific salmon and its environment. Further monitoring activities in the Bering Sea will enable to trace the dynamics of possible changes in ecosystems and to determine the contemporary status of the Pacific salmon in the Bering Sea.

In 2005 TINRO-Centre will continue monitoring of the state of western Bering Sea ecosystems, as well as collection of data on Pacific salmon ecology during the period of their prespawning migrations in the high seas of the northwestern Pacific Ocean. One of the goals of these studies is elucidation and interpretation of mechanisms of interaction between environmental and density-dependent factors and carrying capacity of the Bering Sea. In 2005 the studies on salmon distribution, food selectivity, dependence of salmon feeding on biomass and composition of plankton and nekton communities, changes of biological condition of fishes during the foraging, salmon spatial differentiation, structure of stocks contributing to the mixture and the influence of abiotic environment upon the salmon quantitative allocation and migrations are planned.

SURVEY GOALS AND OBJECTIVES

The goals of surveys are as follows:

I. determination of the current state of Pacific salmon in the pelagic ecosystems of the Bering Sea and high seas of the north-western Pacific Ocean;

II. elucidation of Pacific salmon position and role in the trophic structure of the epipelagic zone of the Bering Sea and high seas of the north-western Pacific Ocean;

III. evaluation pelagic ecosystems status, as well as oceanic and overall ecological conditions in the western Bering Sea in 2004. Achievement of these goals will be accomplished through the fulfillment of the following objectives:

1. Carrying out of upper epipelagic complex trawl survey of the western Bering Sea and adjacent Pacific waters during summer (June-July, RV “TINRO” of TINRO-Center).

2. Estimation of Pacific salmon and other nekton species abundance and biomass. Assessment of their biological condition and spatial distribution patterns, size and age composition of stocks and their mixtures. Sampling for feeding studies.

3. Carrying out of plankton survey of epipelagic zone of North Pacific waters and Bering Sea for collection of data on plankton communities composition and structure, salmon and mass nekton species feeding environment; description and development of nektonic communities trophic structure models

4. Carrying out of hydrological survey for evaluation of climate-oceanic conditions in the areas of surveys.

5. Collection of genetic samples for the subsequent laboratory analysis.

6. Traumatization and infestation of the Pacific salmon in the western Bering Sea research activities.

7. Bioenergetics studies on salmon diets are also expected to be conducted.

8. Salmon tagging will be conducted.

9.

LOCATIONS AND PERIOD OF SURVEYS

The survey by research vessel "TINRO" is planned to begin in port of Vladivostok in June 5, 2005 (provisional date). The first part of the survey (June-July) will be devoted to the comprehensive epipelagic trawl survey of the western Bering Sea and adjacent Pacific waters within Russian EEZ (see figure). The second part of the cruise will be devoted to the research according to the “TINRO-Center” research program of the western Bering Sea. The RV “TINRO” is expected to return to Vladivostok on November 2005.

METHODOLOGY OF STUDIES

Station locations to be sampled by the standard comprehensive survey of the upper epipelagic layer of the western Bering Sea according to TINRO-Centre plan for 2005 are shown in figure. Provisional dates of survey are June 15 – July 31, 2005. Trawlings at RV "TINRO" are carried out by the standard midwater trawl, model RT/TM 80/376 m fished with four 120 m bridles. Heavy orbicular midwater trawl doors, each one of 6 sq.m, are used. Depending on towing speed, the vertical spread of the trawl is 32-42 m and horizontal spread is 30-34 m. At each station the net is towed for 1 hour. The net is towed at about 4.5-5.0 kts with the headrope located at the surface (fixed layer - 0 m), particularly at night. The length of warps is 250-310 m.

At every station of RV "TINRO" the presence and type of parasites and injuries is recorded during biological analysis of salmon. Genetic samples are taken during biological analysis of Pacific salmon. Salmon tagging is performed whenever is possible. Samples are collected for Pacific salmon's bioenergetics studies. Each trawling at RV "TINRO" is accompanied (before or after) by the collection of plankton samples. Samples for fish and squid diet studies are taken from the catch of every trawling and these samples undergo on-board processing. The processing of all samples is carried out by means of express methods of analysis, which were developed by TINRO-center. Hydrological studies are conducted during the whole period of the survey by means of hydrological probe Neil-Brown or by ICTD. The data are recorded for the fixed layer 0-1000 meters and for the areas with the depth less than 1000 meters – down to the bottom.

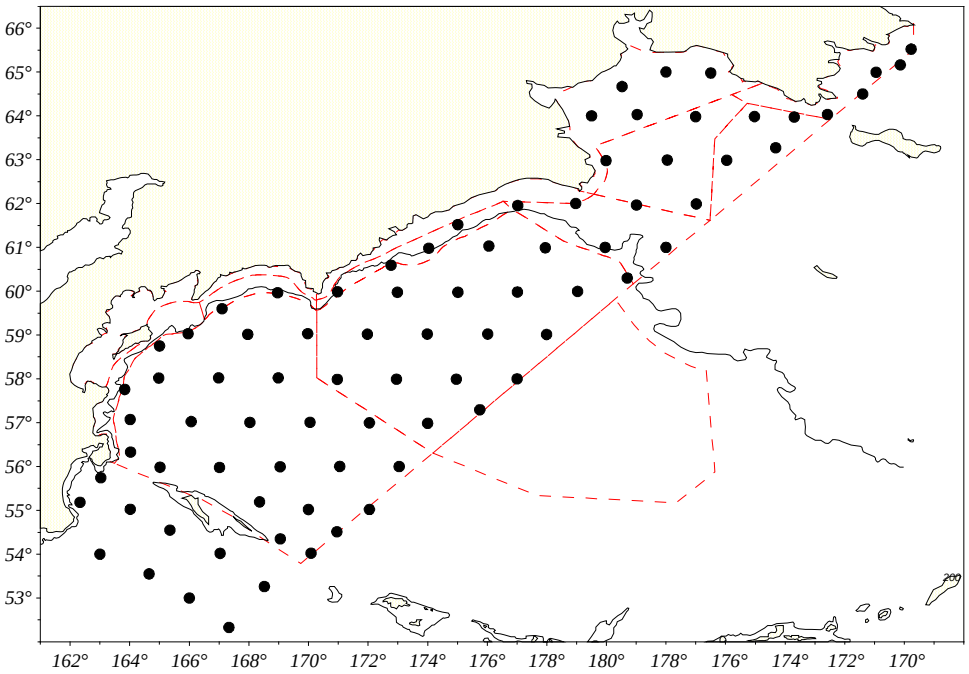

Figure. Station locations to be sampled by the standard comprehensive survey of the upper epipelagic layer of the western Bering Sea and adjacent Pacific waters according to TINRO-Center plan for June-July 2005.